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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,303	11/08/2001	Masakatsu Ota	00684.003281	5183

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FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER

ESPLIN, DAVID B

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 08/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/986,303

Applicant(s)

OTA ET AL.

Examiner

D. Ben Esplin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

Claims 8-10 are objected to because of the following informalities:

Claims 8 and 9 make reference to "the glass material" without a proper antecedent basis and without any explanation as to what glass material is being described. For examination purposes Examiner has read this as limiting the composition of lens elements within a projection optics system.

Claim 10 refers to "said lens system" without a proper antecedent basis.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S.

Patent No. 4,922,290 to Yoshitake et al.

FIG. 1 of Yoshitake shows a projection exposure apparatus that includes an illumination optical system (excimer laser 1) for illuminating a pattern of a reticle (reticle 5) with laser light, a projection optical system (reduction lens 6) for projecting the illuminated pattern onto a substrate (wafer 7) and adjusting means for adjusting an optical characteristic of the projection optical

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system in accordance with a change in wavelength of the laser light. The adjusting means of Yoshitake is shown, in FIG. 1, as a detecting means (wavelength measuring instrument 3) for detecting the wavelength of the laser light, and a correcting means of moving both the reticle and the wafer in the optical axis direction of the projection optical system.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitake as applied to claims 1-4 and 11 above, and further in view of U.S. Patent No. 5,920,398 to Iwanaga et al.

Yoshitake is silent concerning driving means for scaningly moving the reticle and the substrate in order to illuminate the reticle with slit-like light. Iwanaga discloses an exposure apparatus that includes a reticle stage 3 and a wafer stage 5 in order to facilitate the reticle and the substrate being scanned with respect to each other, allowing the reticle to be exposed with slit-like light (col. 5 lines 21+), increasing the surface area of patterns that may be exposed onto the substrate from the reticle. In view of the teachings of Iwanaga it would have been obvious to include a reticle stage and wafer stage capable of relative scanning motion in the apparatus of Yoshitake, and accordingly using slit-like exposure light to expose the pattern of the reticle, in order to increase the potential surface area of the patterns to be exposed.

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Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitake as applied to claims 1-4 and 11 above, and further in view of U.S. Patent No. 5,170,207 to Tezuka et al.

The excimer laser of Yoshitake is disclosed as being an KrF laser, and therefore has a half bandwidth of a wavelength spectrum larger than .1 pm, and is incapable of forming images with linewidths of .13 microns. Tezuka teaches that ArF lasers are a well known alternative to KrF lasers (col. 7 line 67 – col. 8 line 2), showing that it would have been obvious to substitute the KrF laser of Yoshitake with an ArF laser as an art recognized alternative. This substitution would inherently include lasers wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than .1 pm, and would allow an image of a linewidth of .13 microns to be resolved.

The excimer laser of Yoshitake is disclosed as being an KrF laser, and therefore has a half bandwidth of a wavelength spectrum larger than .08 pm, and is incapable of forming images with linewidths of .09 microns. Tezuka teaches that F<sub>2</sub> lasers are a well known alternative to KrF lasers (col. 7 line 67 – col. 8 line 2), showing that it would have been obvious to substitute the KrF laser of Yoshitake with an F<sub>2</sub> laser as an art recognized alternative. This substitution would inherently include lasers wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than .08 pm, and would allow an image of a linewidth of .09 microns to be resolved.

Tezuka shows in FIG. 3 a projection optical system that includes a lens system made up of more than ten lens elements. The system of Tezuka is designed to optimize exposures during lithographic processes made with short wavelength lasers (see abstract). Further, it is disclosed

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that the lenses of the system of Tezuka should be made with SiO<sub>2</sub> or CaF<sub>2</sub> (col. 1 lines 40-44). In view of the teachings of Tezuka, it would have been obvious to include the projection optical system of Tezuka in the apparatus of Yoshitake in place of the reduction lens 6, in order to optimize the exposures performed with short wavelength lasers.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,095,190 to Aketagawa et al. discloses an exposure apparatus with a wavelength detecting means.

U.S. Patent No. 5,838,426 to Shinonaga et al. discloses an exposure apparatus that corrects for irregular wavelengths from an excimer laser.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. Ben Esplin whose telephone number is (703) 305-4022. The examiner can normally be reached on Mon.-Fri. (8am-4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on (703) 308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 308-7382 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*DBE*

DBE

August 20, 2002

*Russell Adams*  
RUSSELL ADAMS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800